The Pan-Pacific Entomologist

Vol. I, No. 3. January, 1925

ON THE GENERA OF CIXIIDÆ, MEENOPLIDÆ AND KINNARIDÆ (FULGOROIDÆ, HOMOPTERA)

BY F. MUIR

Hawaiian Sugar Planters' Experiment Station, Honolulu, T. H.

There are between ten and eleven hundred genera of Homoptera which are grouped together by most Homopterists as a single family, the Fulgoridæ. In a recent publication [1] the writer tried to show good reasons for regarding the genera of this group as consisting of fifteen families, which can be divided into two groups according to the types of male genitalia. Both the Tettigometridæ and the Cixiidæ were shown to contain genera belonging to both of these groups, and it was suggested that the two subfamilies of the Cixiidæ may have arisen separately from tettigometrid forms, and that the Tettigometridæ may be the modern specialized representatives of the primitive fulgorids. Since then the writer has had the opportunity to examine more genera of Tettigometridæ, and he has become more strongly convinced that this interesting group is of prime importance for understanding the relationship of the various families of fulgorids. While the Tettigometridæ are very similar in external appearances, they have very diverse forms of male genitalia, which, to the writer, indicates considerable antiquity. Mr. E. P. Van Duzee has expressed the opinion that the family is more distinctly separated from the rest of the fulgorids than are the other families from one another. This opinion the writer shares, and he has indicated it in the paper above mentioned, especially in the diagram of the affinities of the families. But he would not, on this account, sink the other families into one family, but rather consider the Tettigometridæ as a superfamily, if it be necessary to establish a distinction. If this should be done it could then be divided into two families, one in which the periandrium is large and the penis passes through

1 Proceedings Hawaiian Entomological Society, V, 2 (1923), pp. 205-247.

it (*Tettigometra*), and the other in which the periandrium is basad and the penis is distad (*Egropa*). The latter would then divide into two groups, one in which the genital styles are distinct and movable (*Egropa*), and the other in which they are missing or only represented by fixed processes (*Nototettigometra*). Until the male genitalia of more genera have been examined, it is not possible to say into which of the groups the other genera should be placed.

This conclusion naturally affects the classification of the Cixiidæ because the Meenoplinæ would be descended from a tettigometrid stock and the Cixiinæ from an egropid stock, and it would, therefore, be illogical to keep them in one family. Apart from this theoretical line of reasoning, there are very strong reasons for dividing Cixiinæ from the Meenoplinæ. The two groups are so very distinct that, were it not for the presence of the median ocellus, very few workers would place them together. As it is, the Meenoplinæ have been placed in the Derbidæ, Achilidæ, and Cixiidæ by different workers, which in itself is enough to indicate their distinctiveness.

The decision to regard the Cixiidæ and Meenoplidæ as two families raises the question as to the status of the genus *Kinnara*. This genus has the meenoplid type of male genitalia and so cannot go into the Cixiidæ, except as a matter of expediency to dispose of an inconvenient genus; its relationship to the Meenoplidæ is not close, and to place it in that family would be to break down the chief characters upon which that family is recognized. It holds the same position in the meenoplid group of families as *Achilixius* does in the cixiid group, and it appears to the writer that the best way to deal with it would be to place it in a family by itself, the **Kinnaridæ.** That this decision will meet with opposition from those who regard the whole of the fulgorids as only constituting one family is natural, but to those who consider them as constituting a number of families this decision will appear logical.

While the writer considers that the Cixiidæ (sens. lat.) should be divided into three families, in the present list and table he has dealt with them together, as most workers will expect to find them so, and the chief object of this paper is for convenience.

The list contains 120 generic and 2 subgeneric names, of which 88 are treated as good genera, 28 as direct synonomies,

3 as preoccupied, and 1 (*Bordicea* Walker) discarded for the present.

Most of the synonomies have been accepted by several workers and are, most probably, correct; some of the new synonomies may also be correct, but others may be open to doubt, and only represent the writer's present knowledge. The genus *Ptoleria* Stål, as recognized by the writer, is a large group, and it is hoped that future study will lead to the resurrection of some of the synonomized genera, but from his present knowledge the writer cannot uphold them.

List of Genera of Cixiidæ (sens. lat.)

(‖ = direct synonomies; § = preoccupied)

1. Achæmenes Stål 1866, Hem. Afr. IV, pp. 165, 170. Type *A. notatinervis* Stål.
   ‖ *Adana* Stål 1856, Of. Vet. Ak. Fordh. XIII, p. 16. Type *A. westwoodi* Stål = *Bothriocera tinealis* Burm.
2. Adolenda Distant 1911, Ann. Mag. Nat. Hist. (8) VIII, p. 740. Type *A. typica* Dist.
3. Adolendana Distant 1917, Trans. Linn. Soc. Lond. XVII, p. 278. Type *A. typica* Dist.
   ‖ *Adzapala* Distant 1911, Ann. Mag. Nat. Hist. (8) VIII, p. 739. Type *A. greeni* Dist. = *Oliarus* Stål.
4. Aka White 1879, Ent. Mo. Mag. XV, p. 216. Type *Cixius finitimus* Walker.
   ‖ *Amabalangoda* Distant 1912, Ann. Mag. Nat. Hist. (8) IX, p. 187. Type *A. insignis* Dist. = *Ptoleria* Stål.
5. Andes Stål 1866, Hem. Afr. IV, p. 166. No species mentioned. Type *A. undulata* Stål 1871, Of. Vet. Ak. Forh., p. 747. This genus will date from the latter date. Syn. *Leirioëssa* Kirk.
6. Anigrus Stål 1866, Hem. Afr. IV, p. 172. Type *A. sordidus* Stål.
7. Anila Distant 1906, Faun. Brit. Ind. Rhyn. III, p. 260. Type *A. fuliginosa* Distant.
8. Aulocorypha Berg 1879, Hem. Arg., p. 221. Type *A. punctulata* Berg.
   ‖ *Australoma* Kirkaldy 1907, Haw. Sugar Pltrs. Ent. Bull. III, p. 114. Type *A. austrina* Kirk. = *Ptoleria* Stål.
   ‖ *Bajauana* Distant 1907, Ann. Mag. Nat. Hist. (7) XIX, p. 277. Type *Brixia rufula* Walk.
   ‖ *Barma* Distant 1906, Faun. Brit. Ind. Rhyn. III, p. 266. Type *B. diversa* Dist. = *Borysthenes* Stål.
   ‖ *Bathymeria* Muir 1922, Journ. Linn. Soc. N. S. W., p. 65. Type *B. helmsi* Muir = *Cajeta* Stål.
9. Benna Walker 1857, Journ. Linn. Soc. Lond. I, p. 90. Type *B. capitulata* Walker.

10. BENNARIA Melichar 1914, Philip. Journ. Sci. D. IX, p. 175. Type *B. bimaculata* Mel.
11. BETACIXIUS Matsumura 1914, Annotat. Zoolog. Japan, VIII, 3-4, p. 412. Type *B. ocellatus* Mats.

—. BODECIA Walker 1868, Pro. Linn. Soc. Lond. Zool., X, p. 117. Type *B. varipes* Walk.

12. BORYSTHENES Stål 1866, Hem. Afr. IV, p. 165, no species mentioned; 1866, Berl. Ent. Zeit., p. 165, *Cixius finitus* Walker selected as type. Syn. *Barma* Dist.; *Vademela* Melichar.
13. BOTHRIOCERA Burmeister 1835, Handb. Ent. II, p. 156. Type B. *tinealis* Burm. Syn. *Adana* Stål.
14. BOTHRIOCERODES Fowler 1904, Bio. Cent. Amer. Hom. I, p. 80. Type *B. variegatus* Fowler.
15. BRIXIA Stål 1856, Of. Vet. Ak. Forh. XIII, p. 162. Type *Derbe natalicola* Stål. Syn. *Triopsis* Sign; *Curiatius* Dist.
16. BRIXIDIA Haglund 1899, Of. Vet. Ak. Forh. LVI, p. 60. Type *B. nebulosa* Hagl. (The type specimen is labeled *Brixiola nebulosa* Hagl.)
17. CAJETA Stål 1866, Hem. Afr. IV, p. 150, no species mentioned; 1866, Berlin Ent. Zeit. X, p. 391. *C. singularis,* type described. Syn. *Bathymeria helmsi* Muir.
18. CALAMISTER Kirkaldy 1906, Haw. Sugar Pltrs. Ent. Bull. I, p. 396. Type *C. obscurus* Kirk.
19. CALERDA Signoret 1863, Ann. Soc. Ent. France (4), III, p. 583. Type *C. biocellata* Sign.
    || *Caneirona* Distant 1916, Faun. Brit. Ind. Rhyn. VI, p. 38. Type *C. indica* Dist. = *Ptoleria* Stål.
20. CAROLUS Kirkaldy 1906, Haw. Sugar Pltrs. Ent. Bull. I (9), p. 401. Type *C. crispus* Kirk.
    || *Ciocixius* Metcalf 1923, Jour. Elisha Mitchell Scien. Soc., p. 183, Type *Cixius dorsivittatus* Van Duzee = *Pintalia.*
21. CIXIOSOMA Berg. 1879, Hem. Argen., p. 220. Type *C. platensis* Berg.
22. CIXIUS Latreille 1804, Hist. Nat. Crust. Ins. XII, p. 310. Type *Cicada nervosa* L. Syn. *Vincentia.*
23. COLVANALIA Muir. n. g.
    || *Commolenda* Distant 1911, Ann. Mag. Nat. Hist. (8) VIII, p. 741. Type *C. deusta* Dist. = *Ptoleria* Stål.
    || *Cotyleceps* Uhler 1895, Pro. Zoo. Soc. Lond., p. 63. Type *C. decorata* Uhler = *Pintalia* Stål.
24. CUBANA Uhler 1895, Pro. Zoo. Soc. Lond., p. 62. Type *C. tortrix* Uhler.
    || *Curiatius* Distant 1917, Trans. Linn. Soc. Lond. XVII, p. 285. Type *C. insignis* Distant = *Brixia* Stål.
25. DIACIRA Stål. 1860, K. Sven. Vet. Ak. Hand. III, No. 6, p. 3. Type *D. moerens* Stål.
26. DUILIUS Stål 1858, Of. Vet. Ak. Forh. XV, p. 319. Type *D. tenuis* Stål.

27. DYSTHEATIAS Kirkaldy 1907, Haw. Sugar Pltrs. Ent. Bull. III, p. 113. Type *D. beecheyi* Kirk. Syn. *Quirosia* Kirk.; *Saccharias* Kirk.

‖ *Entithena* Fieber 1866, Verh. z. b. Ges. Wien. XVI, p. 499. Type *Flata musiva* Germ. = *Myndus* Stål.

28. EPARMENE Fowler 1904, Bio. Cent. Amer. Hom. I, p. 81. Type *E. pulchella* Fowler.

29. EPOLIARUS Matsumura 1910, Jour. Coll. Sci. Tokyo, XXVII, p. 11. Type *E. politus* Mats.

30. EPONISIA Matsumura 1914, Ann. Mus. Nat. Hung. XII, p. 285. Type *E. guttula* Mats.

31. EUCARPIA Walker 1856, Jour. Linn. Soc. Lond. Zoo. I, p. 159. Type *E. univitta* Walk.

32. EURYPHLEPSIA Muir 1922, Philip. Jour. Sci. XX, p. 114. Type *E. amboinensis* Muir.

33. GELASTOCEPHALUS Kirkaldy 1906, Haw. Sugar Pltrs. Ent. Bull. I, p. 396. Type *G. ornithoides* Kirk.

‖ *Haplacha* Lethierry 1874, Pet. Nouv. Ent. I, p. 444. Type *H. seticulosa* Leth. = *Hemitropis* Fieb.

34. *Haplaxius* Fowler 1904, Bio. Cent. Amer. Hom. I, p. 80. Type *H. lævis* Fowler.

35. HEMITROPIS Fieber 1866, Ver. z. b. Ges. Wien. XVI, p. 499. Type *H. bipunctata* Fieber. Syn. *Haplacha* Leth.

36. HUTTIA Myers 1924, Trans. New Zealand Inst. LV, p. 321. Type *H. nigrifrons* Myers.

37. HYALESTHES Signoret 1865, Ann. Soc. Ent. France (4), V, p. 128. Type *H. obsoletus* Sign. Syn. *Liorhinus* Kirschb.

38. INXWALA Distant 1907, Ins. Transval., p. 197. Type *I. modesta* Distant.

39. IOLANIA Kirkaldy 1902, Faun. Haw. III, p. 118. Type *I. perkinsi* Kirk.

40. IPSNOLA Signoret 1885, Ann. Soc. Ent. France (6), V, p. 69. Type *I. sextuberculata* Sign.

41. KERMESIA Melichar 1903, Hom. Faun. Ceylon, p. 52. Type *K. albida* Mel.

42. KINNARA Distant 1906, Faun. Brit. Ind. Rhyn. III, p. 289. Type *Pleroma ceylonica* Melichar. New name for *Pleroma* Melichar, preoccupied.

§ *Kirbya* Melichar 1903, Hom. Faun. Ceylon, p. 37. Type *K. pagana* Mel.; preoccupied = *Kirbyana* Dist.

43. KIRBYANA Distant 1906, Faun. Brit. Ind. Rhyn. III, p. 262. New name for *Kirbya* Mel. Syn. *Kirbyella* Kirk.

‖ *Kirbyella* Kirkaldy 1906, Entomologist, p. 248. New name for *Kirbya* Melichar = *Kirbyana* Dist.

44. KOROANA Myers 1924, Trans. New Zealand Inst. LV, p. 319. Type *K. helena* Myers.

81. ROBIGALIA Distant 1916, Faun. Brit. India, Rhyn. VI, p. 56. Type *R. butleri* Distant.
    || *Saccharias* Kirkaldy 1907, Ann. Soc. Ent. Belg. LI, p. 125. Type *S. deventeri* Kirk. = *Dystheatias* Kirk.
82. SEMO White 1879, Ent. Mo. Mag. XV, p. 217. Type *S. clypeatus* White.
83. SALONAIMA Kirkaldy 1906, Haw. Sugar Pltrs. Ent. Bull. I, p. 396. Type *S. solonaima* Kirkaldy. Syn. *Talaloa* Distant.
84. SOUTHIA Kirkaldy 1904, Entomologist, XXXVII, p. 279. New name for *Paulia* Stål preoccupied. Type *Delphax opposita*. Fabr.
85. STENOPHLEPSIA Muir 1922, Philip. Jour. Sci. XX, No. 1, p. 117. Type *S. flava* Muir.
86. SUVA Kirkaldy 1906, Haw. Sugar Pltrs. Ent. Bull. I (9), p. 428. Type *S. koebelei* Kirk.
    || *Talaloa* Distant 1907, Ann. Mag. Nat. Hist. (7) XIX, p. 295. Type *T. pallescens* Dist. = *Solonaima* Kirk.
87. TIRITEANA Myers 1924, Trans. New Zealand Inst. LV, p. 325. Type *T. clarkei.*
88. TRIGONOCRANUS Fieber 1876, Rev. Zool. (3) III, p. 349. Type *T. emmeæ* Fieb.
    || *Triopsis* Signoret 1860, Ann. Soc. Ent. France (3) VIII, p. 187. Type *T. fasciata* Sign. = *Brixia* Stål.
88. TRIRHACUS Fieber 1876, Rev. Zool. (3) III, p. 354. Type *T. setulosus* Fieber.
    || *Urvillea* Kirkaldy 1907, Haw. Sugar Pltrs. Ent. Bull. III, p. 110. Type *U. melanesica* Kirk. = *Oliarus.*
    || *Vademela* Melichar 1914, Notes Leiden Mus. XXXVI, p. 100. Type *V. fusconotata* Mel. = *Borysthenes* Stål.
    || *Vincentia* Uhler 1895, Pro. Zool. Soc. Lond., p. 67. Type *V. interrupta* Uhler = *Cixius.*
90. VOLCANALIA Distant 1917, Trans. Linn. Soc. Lond. XVII, p. 279. Type *V. typica* Dist.

DICHOTOMOUS TABLE OF THE GENERA OF CIXIIDÆ (sens. lat.)

1. (142) Clavus not granulate.

CIXIIDÆ, sens. stric.

2. (133) No subantennal process and antennæ not sunk into a pit.

CIXIINI

3. (6) Sc, R and M all arising from basal cell and not forming a stalk; body laterally compressed; tegmina steeply tectiform.
4. (5) Front coxæ not produced, straight on outer margin, *Andes.*
5. (4) Front coxæ considerably produced and rounded on outer margin, *Parandes.*
6. (3) Sc, R and M not all arising from basal cell, two or more forming a stalk.

7. (100) Sc + R forming a stalk, M arising from basal cell, or from the base of Sc + R but not forming a common stalk with them.
8. (11) Base of abdomen with a pair of long, slender processes; abdomen laterally compressed, tegmina steeply tectiform.
9. (10) Median frontal carina distinct, *Benna.*
10. (9) Median frontal carina absent or indistinct, *Bennaria.*
11. (8) Base of abdomen without processes.
12. (37) Body considerably compressed laterally; tegmina steeply tectiform, apical margins coming together when at rest. Ovipositor generally complete, female pygofer generally longer than wide, sometimes with a longitudinal depression in which the ovipositor reposes.
13. (20) Vertex conical or the length in middle twice or more the width at apex; vertex generally produced considerably in front of eyes.
14. (15) Clypeus without lateral carinæ; no median frontal carina or only on apical half, *Gelastocephalus.*
15. (14) Lateral carinæ on clypeus and median carina on frons distinct.
16. (19) Length of vertex in middle considerably greater than width at base.
17. (18) Vertex narrow, base acutely angularly emarginate, apical transverse carina acutely angular, *Nesocharis.*
18. (17) Vertex broader, base roundly emarginate, apex truncate with the median carina of frons projecting in middle, apex but slightly narrower than base, *Adolendana.*
19. (16) Length of vertex less than the width at base, *Nothocharis.*
20. (13) Length of vertex in middle less than twice the width at apex.
21. (22) Seven apical Rs and seven apical Ms (1, a, b, 2, 3, 4, a), *Melandeva.*
22. (21) Four or less apical Rs and seldom more than five apical Ms.
23. (32) A distinct transverse carina across vertex, curved, angular or straight, apart from a carina more or less distinct dividing frons from vertex, which it ofttimes touches in the middle.
24. (27) Base of vertex acutely angularly, or deeply roundly emarginate.
25. (26) Apex of vertex angularly emarginate; apex of tegmina broad, subtruncate; forking of M3—4 near to Mf, M4a present. Second segment of antenna longer than wide, *Brixidia.*
26. (25) Apex of vertex not emarginate. Fork of M1-2 near to Mf; apex of tegmina round, *Cubana.*

27. (24) Base of vertex not angularly emarginate, straight or shallowly rounded.
28. (29) Face considerably wider than long, *Leptochlamys*.
29. (28) Face not wider than long, or but very slightly.
30. (31) Apex of vertex subequal in width to base, length subequal to width, sides slightly arcuate, median frontal carina projecting in front, *Achæmenes*.
31. (30) Vertex broader at base than at apex, *Pintalia*.
32. (23) No median transverse carina on vertex (not counting apical carina dividing vertex from frons).
33. (34) Vertex distinctly angularly emarginate at apex, *Kirbyana*.
34. (33) Vertex truncate at apex or very slightly produced or emarginate.
35. (36) Vertex rather long, length in middle equal to or greater than the width at apex, *Dystheatias*.
36. (35) Width at apex greater than the length in middle, *Ptoleria*.
37. (12) Body not considerably compressed laterally, tegmina not so steeply tectiform, apical margins not coming together when at rest. Ovipositor often incomplete, female pygofer often flat, broader than long and secreting long wax filments.
38. (39) M3 and M4 forking close to Mf; M1 and M2 forking much farther away from Mf, *Mnemosyne*.
39. (38) The fork of M1 and M2 nearer to Mf than the fork of M3 and M4.
40. (53) Mesonotum with five carinæ.
41. (42) Face without a median longitudinal carina, *Huttia*.
42. (41) Face with a median longitudinal carina, sometimes imperfect.
43. (44) Median frontal carina forked about middle, obscure over base of frons and apex of vertex; no transverse carina on vertex, *Malpha*.
44. (43) Median frontal carina simple or forked basad of middle.
45. (52) A transverse carina on vertex apart from the apical one.
46. (49) A median longitudinal carina between the transverse carina and base of vertex.
47. (48) Transverse carina forming a single arc, *Mesoliarus*.
48. (47) Transverse carina forming two arcs, *Epoliarus*.
49. (46) No median longitudinal carina on vertex, or only on basal portion and not reaching transverse carina.
50. (51) Vertex with an acutely angular transverse carina which joins the apical transverse carina in middle, thus forming two areolets on the apical lateral portions of vertex.
    (*a*) Hawaiian species, *Oliarus* subgenus *Nesoliarus*.
    (*b*) Not Hawaiian species, typical *Oliarus*.

51. (50) Vertex with a straight or nearly straight transverse carina generally near apex, which is not connected with the apical transverse carina.
    (*a*) Hawaiian species, *Oliarus* subgenus *Nesoliarus*.
    (*b*) Not Hawaiian species, *Oliarus* subgenus *Nesopompe*.
52. (45) No transverse carina on vertex (excluding apical transverse carina); Sc — R forking near stigma, Cu forking near apex of clavus, *Hyalesthes*.
53. (40) Mesonotum with less than five carinæ.
54. (55) Antennæ as long as face, second segment much longer than wide, *Solonaima*.
55. (54) Antennæ much shorter than face, second segment as wide as long or but a little longer than wide.
56. (63) Clypeus without median carina, with lateral carinæ.
57. (58) Vertex very short, width about eight times the length, *Moysella*.
58. (57) Vertex much longer in proportion.
59. (60) Clypeus convex, swollen, *Semo*.
60. (59) Clypeus flat, not swollen.
61. (62) Apex of vertex truncate, fairly wide. Sc + R forking at stigma, Cu forking at apex of clavus, *Eparmene*.
62. (61) Apex of vertex narrow. Sc + R and Cu forking considerably basad of stigma, *Hemitropis*.
63. (56) Clypeus with a median carina.
64. (65) Carina between vertex and frons obsolete, median frontal carina absent or only present on apical portion, *Kuvera*.
65. (64) Carina between vertex and frons and the median frontal carina distinct.
66. (67) Median frontal carina forking in apical half of frons, *Aka*.
67. (66) Median frontal carina simple or forking before middle or absent.
68. (85) Vertex without a transverse carina.
69. (74) Vertex much wider than long, apex truncate.
70. (71) Basal half of frons slightly convex, apical half concave, no median frontal carina, *Diacira*.
71. (70) Basal half of frons not convex, the whole more or less concave.
72. (73) Tegmina broad, Mf basad of middle, *Mundopa*.
73. (72) Tegmina narrower, Mf distad of middle, *Bothriocerodes*.
74. (69) Vertex as long as, or longer than, wide.
75. (76) Counting along the middle line more than half the vertex projecting beyond the eyes; apex roundly conical, *Carolus*.
76. (75) Counting along the middle line less than half the vertex projecting beyond the eyes; apex generally angular.
77. (82) A distinct median longitudinal carina on vertex.

78. (79) Base of vertex truncate or but slightly emarginate, *Trigonocranus.*
79. (78) Base of vertex distinctly and deeply emarginate.
80. (81) Median vein simple without branches, tegmina narrow beyond clavus, which reaches nearly to the apex, *Trirhacus.*
81. (80) Clavus ending considerably before apex beyond which tegmina is slightly broadened and round; M with 5 apical veins, 1, 1a, 2; 3, 4, *Olonia.*
82. (77) No median longitudinal carina on vertex.
83. (84) Length of vertex about six times the width, very narrow, width at apex subequal to base, *Volcanalia.*
84. (83) Vertex not so narrow, width at base subequal to length in middle, apex much narrower than base, *Colvanalia.*
85. (68) Vertex with a transverse carina apart from the carina between vertex and frons.
86. (87) Pronotum with a distinct shoulder carina behind the eyes to tegula, *Calamister.*
87. (86) Pronotum without shoulder carina; lateral pronotal carinæ following hind margin of eyes and approaching the lateral margin.
88. (93) Transverse carina of vertex straight, near the middle of vertex.
89. (90) Front coxæ large, front tibiæ and femora short and thick, *Cajeta.*
90. (89) Front legs slender, coxæ not large.
91. (92) No spines on hind tibiæ or very small ones, *Myndus.*
92. (91) Large spines on hind tibiæ, *Koroana.*
93. (88) Transverse carina on vertex angular, sometimes joining the apical carina in middle.
94. (99) Hind tibiæ with well-developed spines.
95. (96) A transverse vein in middle of costa, *Anila.*
96. (95) No transverse vein in middle of costa.
97. (98) Second segment of antennæ small, *Cixius.*
98. (97) Second segment of antennæ large, globose, *Cixiosoma.*
99. (94) Hind tibiæ without spines or only very small ones, *Iolania.*
100. (7) M arising from the stalk Sc + R some distance from its base, making a distinct, if a short, Sc + R + M stalk.
101. (104) Second segment of antennæ longer than broad; body considerably compressed laterally, tegmina steeply tectiform.
102. (103) Mesonotum 3—carinate, pronotum angularly emarginate on hind margin, *Brixia.*
103. (102) Mesonotum 1—carinate, pronotum nearly truncate on hind margin, *Southia.*
104. (101) Second segment of antennæ about as long as broad; tegmina not steeply tectiform.
105. (106) Mesonotum with 5 carinæ, *Œcleus.*

106. (105) Mesonotum with less than 5 carinæ.
107. (108) Vertex as long as, or longer than, pronotum and mesonotum together, produced considerably in front of eyes, *Rhamphixius.*
108. (107) Vertex much shorter, not produced greatly in front of eyes.
109. (110) Frons broader than long, subcircular, no median carina, *Microledrida.*
110. (109) Frons not subcircular, generally longer than wide.
111. (116) With a median frontal carina.
112. (113) Vertex conical in outline, with a short longitudinal carina, *Carolus.*
113. (112) Vertex not conical, apex truncate.
114. (115) With a straight transverse median carina on vertex, *Myndus.*
115. (114) Without a transverse carina on vertex, *Haplaxius.**
116. (111) Without a median frontal carina.
117. (118) Vertex much broader than long, *Pachyntheisa.*
118. (117) Vertex not broader than long.
119. (120) Vertex conical in outline; no lateral carinæ on clypeus, *Gelastocephalus.*
120. (119) Vertex not conical.
121. (122) Vertex very narrow, *Œclidius.*
122. (121) Vertex much broader.
123. (130) Length of frons subequal to width or not much longer than wide.
124. (127) Vertex with a median logitudinal carina.
125. (126) No carinæ on clypeus, *Duilius.*
126. (125) Clypeus carinate at sides; no median frontal carina, *Platycixius.*
127. (124) Vertex without a median longitudinal carina.
128. (129) Sc + R, M and Cu fork near the nodal line, *Micrixia.*
129. (128) Sc + R and Cu fork some considerably distant from nodal line.
130. (123) Frons about twice as long as broad, sides straight, widest at apex.
131. (132) Lateral carinæ of frons large, *Adolenda.*
132. (131) Lateral carinæ of frons small, *Paramicrixia.*
133. (2) Subantennal process present or antennæ sunk into pits.

BOTHRIOCERINI

134. (135) Face broadest at base, in lateral view strongly curved in front of eyes; antennæ sunk into pits, no subantennal process, *Bothriocera.*

---

* *Nymphocixia* Van Duzee runs down to this genus but is easily distinguished by the occiput being arcuate and the base of the vertex overlapping the middle of pronotum; the frons also is longer than wide, narrow at base and gradually increasing to before apex; vertex with subparallel sides and deep keels.

135. (134) Face not broadest at base; with a subantennal process.
136. (137) Sc and R not forming a stalk or only a very short one, *Borysthenes.*
137. (136) Sc + R forming a long stalk.
138. (139) M arising from basal cell or from base of Sc + R; R touching M for short distance about level with node; costal cell wide, stigma large; claval fork near apex of clavus and claval vein in cases joining suture (Kinnaridæ), *Kinnara.*
139. (138) M arising from Sc + R stalk some distance from base.
140. (141) Sc + R forking near stigma, M arising from near middle of Sc + R which is thickened; costal cell large, *Eurypheplepsia.*
141. (140) Sc + R forking considerably before stigma; M arising nearer to base of stalk; Sc + R not thickened, *Stenophlepsia.*
142. (1) Clavus granulate.

MEENOPLIDÆ

143. (148) With a median frontal carina.
144. (145) Claval veins united near apex of clavus, *Phaconeura.*
145. (144) Claval veins united about the middle of clavus.
146. (147) Mesonotum with one carina, *Anigrus, Inxwala.*
147. (146) Mesonotum with 3 carinæ, *Paranigrus.*
148. (143) Without a median frontal carina.
149. (150) M leaving Sc + R stalk considerably beyond base, *Kermesia, Eponisia.*
150. (149) M leaving basal cell or the Sc + R stalk at base.
151. (154) Claval veins forking near apex of clavus.
152. (153) Clypeus with lateral carinæ, *Robigalia, Suva.*
153. (152) Clypeus without lateral carinæ, *Nisia.*
154. (151) Claval veins forking near middle of clavus.
155. (156) Vertex longer than broad, without a median carina, *Meenoplus.*
156. (155) Vertex not longer than broad, with a median carina, *Paranisia.*

(To be Continued)

PLEOCOMA BEHRENSI

The first heavy rain of the season at Berkeley fell on October 15. On the two days following, a number of *Pleocoma behrensi* Lec. were taken in Strawberry Cañon near Berkeley. Several males were taken in flight, and a few males and about twenty females were dug from their holes, which showed plainly in the packed earth of the trails.—A. C. Davis.

STUDIES OF WESTERN NORTH AMERICAN CARABINÆ (COLEOPTERA) WITH DESCRIPTIONS OF NEW SPECIES

BY EDWIN C. VAN DYKE
University of California, Berkeley

Trachypachus slevini Van Dyke, new species

Robust, elongate, elliptical, piceous, brilliantly bronzed and shining above, less so beneath, antennæ rufo-piceous, legs rufous. Head three-fourths breadth of prothorax, convex, smooth and shining, eyes but slightly convex. Prothorax three-fourths as long as broad, apex emarginate, anterior angles prominent, base bisinuate; sides moderately arcuate in front, almost straight and parallel behind, rather broadly margined; disc convex, smooth and shining, median longitudinal line complete and finely impressed, basal transverse impression deep, ending externally in deep and oblique basal foveæ, the carinæ prominent and extending forwards and inwards from the hind angles. Elytra three-fifths as broad as long, slightly broader at base than prothorax, widest at middle; sides evenly arcuate from base to apex, apical angles quite acute; disc convex, deeply and coarsely punctured, finer at sides and apex, the punctures arranged in rows, the striæ but faintly defined and only near suture. Length, 7 mm.; breadth, 3 mm.

Type, a unique female, No. 1616, Mus. Calif. Acad. Sci., captured at **Olney** (near Astoria), **Oregon,** in July, 1911, by Mr. J. R. Slevin.

This fine species, I take pleasure in naming after its captor. It differs from our other species, *Trachypachus inermis* Mots. and *Trachypachus gibbsi* Lec., by being considerably larger, proportionally more elongate, less robust and convex, by having the eyes less prominent, and the elytra very coarsely punctured.

The tribe to which this insect belongs is a very peculiar one, both because of the physical peculiarities and the distribution. In appearance, the species resemble some of the smaller *Amara* or, even more, certain of the genus *Bembidium* like *Bembidium nitidum* Kirby. They, however, have a character, the extension of the posterior coxæ to the lateral margins, which is to be found in no other Carabidæ, and thus places them in a more or less isolated position. The tribe contains but two genera: *Systolosoma* Sol. with one species, *Systolosoma breve* Sol., restricted to Southern Chili, and *Trachypachus* Mots. with *Trachypachus zetterstedi* Gyll., found in the extreme northern portion of Europe and in Siberia, the two questionable species

Trachypachus transversicollis Mots. and *Trachypachus laticollis* Mots. from the Amur region of Siberia, and three species found in the northwestern part of North America. Of these last, *Trachypachus slevini* n. sp. has only been found as indicated at Olney, Oregon, that is, in the wet belt or maritime portion of the Pacific Slope; *Trachypachus inermis* Mots. along the Pacific Coast from Southeastern Alaska to San Francisco, California, and at high levels along the Cascade Mountains and northern Sierra Nevada Mountains and through the Rocky Mountains as far as Colorado; while *Trachypachus gibbsi* Lec. is found in western Washington and Oregon and continues along the coast into Humboldt County, California, and from Oregon along the Cascades and Sierra Nevada Mountains as far south as Mt. Whitney. The three species of *Trachypachus* described by Colonel Casey[1] are undoubtedly synonyms of the above, *Trachypachus alticola* Csy. being the same as *Trachypachus gibbsi* Lec. and *Trachypachus oregonus* Csy. and *Trachypachus specularis* Csy., the same as *Trachypachus inermis* Mots. My series of specimens not only runs them together, but shows a continuous distribution. *Trachypachus holmbergi* Mann. (Bul. Mosc. XXVI, 1853, p. 119) is a synonym of *Trachypachus inermis* Mots. and *Trachypachus californicus* Mots. (Bul. Mosc. XXXVII, 1864, p. 194) undoubtedly is a synonym of *Trachypachus gibbsi* Lec.

The following table will aid in separating our species:

Prothorax distinctly narrower at base than at middle, basal transverse impression deep.

Eyes slightly convex, elytra with rows of deep and coarse punctures over entire area. Length, 7 mm. ..... *slevini* n. sp.

Eyes very convex, elytra quite smooth, the basal portions of but three or four rows of minute punctures indicated. Length, 4.5-5.5 mm. ..... *inermis* Mots.

Prothorax but little narrower at base than at middle, basal transverse impression vague. Eyes prominent, the elytra with remnants of four or five rows of fine punctures. Length, 6. mm. ..... *gibbsi* Lec.

Elaphrus parviceps Van Dyke, new species

Moderately robust, somewhat shining, upper surface closely and finely punctate, greenish bronze, the sides more evidently greenish, ocellate spots of elytra a deep violet. Head slightly longer than broad across eyes, eyes but moderately prominent, far less so than is the rule

1 "Memoirs on the Coleoptera," IX, by Thos. L. Casey, April 8, 1920, pp. 144-146.